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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,811	06/09/2006	Hiroaki Matsumura	5232-0102PUS1	1910
2292 7590 08/15/2007 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			EXAMINER NIU, XINNING	
			ART UNIT 2828	PAPER NUMBER
			NOTIFICATION DATE 08/15/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/563,811	<b>Applicant(s)</b> MATSUMURA ET AL.	
	<b>Examiner</b> Xinning(Tom) Niu	<b>Art Unit</b> 2828	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 June 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 11, 16, 18, 19, 21 and 22 is/are rejected.
- 7) ☒ Claim(s) 6-10, 12-15, 17 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____  |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :10/12/2006, 06/09/2006, 01/09/2006.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 11, 16, 18, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tojo et al. (2004/0105473) in view of Kume et al. (2004/0213315) and Kozaki (2002/0053676).

3. Regarding claim 1, Tojo et al. disclose: a nitride semiconductor layer that has a n-type semiconductor layer (23), an active layer (25), a p-type semiconductor layer (27) laminated on or above a substrate (11), and has a stripe shaped waveguide region for laser light (Figure 1, [0031]-[0033]); end surface protective films (43, 44) on the both end surface of resonance sandwiching the waveguide region (Figure 1, [0038]). Tojo et al. do not disclose: a nitride semiconductor substrate, luminescent radiation region that absorbs light emitted from the active layer and emits luminescent radiation with a wavelength longer than the wavelength of the emitted light, and at least one of the end surface protective film have a high reflectivity for the wavelength of the luminescent radiation from the luminescent radiation region. However, Kozaki discloses: GaN substrate (101) (Figure 1, [0142]). It would have been obvious to one having ordinary

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skill in the art at the time the invention was made to have modified the device of Tojo et al. by growing the laser device on a GaN substrate in order to prevent a large number of dislocations from forming during growth. Kume et al. disclose: absorbing layer (15A) that absorbs light emitted from the active layer (17) (Figure 1, [0067]). It is inherent that the absorbing layer will emit luminescent radiation after absorbing light from the active layer and the emitted radiation will be a longer wavelength than the wavelength of the emitted light. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the device of Tojo et al. by incorporating an absorbing layer into the substrate in order to prevent the leakage of spontaneous emission. It would also have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the device of Tojo et al. by modifying the reflectivity the one of the protective films in order to prevent the leakage of spontaneous emission.

4. Regarding claim 2, Tojo et al. disclose: end surface protective films (43, 44) located on the end surfaces both on the emission side and the rear side (Figure 1, [0038]).

5. Regarding claim 3, Tojo et al. disclose: end surface protective film (43) has a low reflectivity for the wavelength of the emitted light from the active layer (Figure 1, [0038]).

6. Regarding claim 4, Tojo et al. disclose: single layer reflective film (Figure 1, [0038]).

7. Regarding claim 5, Tojo et al. disclose: a nitride semiconductor layer that has a n-type semiconductor layer (23), an active layer (25), a p-type semiconductor layer (27) laminated on or above a substrate (11), and has a stripe shaped waveguide region for laser light (Figure 1, [0031]-[0033]); end surface protective films (43, 44) on the both end surface of resonance sandwiching the waveguide region (Figure 1, [0038]), a second end surface protective film (44) having a high reflectivity for the wavelength of the emitted light from the active layer (Figure 1, [0038]). Tojo et al. do not disclose: a nitride semiconductor substrate, luminescent radiation region that absorbs light emitted from the active layer and emits luminescent radiation with a wavelength longer than the wavelength of the emitted light, and at least one of the end surface protective film have a high reflectivity for the wavelength of the luminescent radiation from the luminescent radiation region, the emission side end surface protective film includes a third end surface protective film having a high reflectivity for the wavelength of the luminescent radiation. However, Kozaki discloses: GaN substrate (101) (Figure 1, [0142]). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the device of Tojo et al. by growing the laser device on a GaN substrate in order to prevent a large number of dislocations from forming during growth. Kume et al. disclose: absorbing layer (15A) that absorbs light emitted from the active layer (17) (Figure 1, [0067]). It is inherent that the

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absorbing layer will emit luminescent radiation after absorbing light from the active layer and the emitted radiation will be a longer wavelength than the wavelength of the emitted light. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the device of Tojo et al. by incorporating an absorbing layer into the substrate in order to prevent the leakage of spontaneous emission. It would also have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the device of Tojo et al. by modifying the reflectivity of the first end surface protective film and adding a third end surface protective film in order to prevent the leakage of spontaneous emission.

8. Regarding claim 11, Tojo et al. disclose: second end surface protective film (44) is formed in contact with the nitride semiconductor layer (Figure 1, [0038]).

9. Regarding claim 16, Tojo et al. disclose: emission wavelength of 400 nm ([0004]).

10. Regarding claim 18 and 19, Kume et al. disclose: absorbing layer (15A) that absorbs light emitted from the active layer (17) (Figure 1, [0067]). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the device of Tojo et al. by forming the light absorbing in

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a stripe shape below the waveguide region and substantially parallel to the waveguide region in order to prevent leakage of spontaneous emission.

11. Claims 21, 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Tojo et al. (2004/0105473) in view of Kume et al. (2004/0213315) and Kozaki (2002/0053676) and Wada et al. (2002/0141321).

12. Regarding claim 21, Tojo et al. as modified disclose the claimed invention except a detector that detect the light emission of the nitride semiconductor device, wherein the detector has a spectral sensitivity in a wavelength  $\lambda_{ex}$  of the luminescent radiation higher than a wavelength of  $\lambda_{ld}$  of the emitted light of the nitride semiconductor laser. However, Wada et al. disclose: GaN laser device (1) optically coupled to a photodetector (9) (Figure 1, [0091]). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the device of Tojo et al. by coupling a photodetector to the laser device in order to monitor the light emitting from the luminescent region.

13. Regarding claim 22, Tojo et al. as modified disclose the claimed invention except a detector that detect the light emission of the nitride semiconductor device, wherein the detector has a spectral sensitivity in a wavelength  $\lambda_{ex}$  of the luminescent radiation higher than a wavelength of  $\lambda_{ld}$  of the emitted light of the nitride semiconductor laser. However, Wada et al. disclose: GaN laser device (1) optically coupled to a



photodetector (9) (Figure 1, [0091]). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the device of Tojo et al. by coupling a photodetector to the laser device in order to monitor the light emitting from the luminescent region.

***Allowable Subject Matter***

14. Claims 6-10, 12-15, 17, 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xinning(Tom) Niu whose telephone number is 571-270-1437. The examiner can normally be reached on M-T, 7:30-5:00 EST, Alternate Fridays 7:30-4:00 ES.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Min Sun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Xinning Niu  
07/25/2007

